# Compucorp®

System Guide 12:

Math

# Overview

Documents often contain more than words. Many documents contain numbers that need to be added, subtracted, multiplied, or divided. If you work with documents like these, you probably perform some of the calculations yourself, or at least check them to make sure they are correct.

System Guide 12 will show you how the OMEGA interactive and automatic math features can make it easier to perform and check calculations. Section 1 covers OMEGA's interactive math feature. You will learn how to use the system like a calculator, as well as how to calculate and verify row and column totals quickly. In Sections 2, 3, and 4, you will be introduced to OMEGA's automatic math feature, OMEGAMATH. You will learn to use this feature to perform basic, intermediate, and advanced math operations on numbers in tables and in text.

### Sections

1. Interactive Math
2. Automatic Math—Basic Instructions
3. Automatic Math—Intermediate Instructions
4. Automatic Math—Advanced Instructions

**Turn to the next page to begin Section 1.**

1

# Interactive math

Interactive math is one of the two math features that OMEGA offers. This math feature is called "interactive" because it depends on you to supply the numbers and instructions for each calculation. OMEGA's interactive math feature is best suited to calculations that are short and have few repeated operations.

## Applications

With OMEGA interactive math, you can perform three types of operations. These calculations are described below and illustrated at the right.

- **Short calculations:** You can use the system like a calculator to perform the short calculations that occasionally come up while typing a document.

- **Row calculations:** You can calculate, verify, and insert totals quickly in "rows," or groups of numbers arranged horizontally.

- **Column calculations:** You can also calculate, verify, and insert totals in "columns," or groups of numbers arranged vertically.

Short Calculations

```
By ordering before June 1st, you
can also receive a 50% savings on
the second item.  For example:

    345.00   Item A
   +172.51   Item B at 50%
    517.51   Cost to you

This special is in effect only for
new subscribers who order by June
1.
```

Row Calculation

```
The third quarter showed consistent
growth in sales.

 1        2        3        Total
50,000   62,000   76,000   188,000

The fourth quarter is forecasted to
continue this trend.
```

Column Calculation

```
The following amounts are overdue for
account #67455:

            220.25
            150.00
            389.50
            759.75

If payment is not received within 30
days, the amount will be referred to a
collection agency.
```

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# Interactive math modes

The three modes available with OMEGA interactive math are the calculator, horizontal, and vertical modes. You can easily switch from typing or editing a document to one of these interactive modes by typing the proper command. The calculator mode allows you to add, subtract, multiply, and divide numbers as though you were using a calculator. The horizontal and vertical modes let you calculate and verify totals in rows and columns of figures. Horizontal and vertical math also let you insert the totals from math operations into tables or text. These three interactive math modes have several characteristics in common.

Common characteristics

- **Use of keys:** Each mode makes use of the numeric ten-key pad and the special function keys labeled in green (+, -, x,÷, =, CHG SIGN key, and RESET key). These keys are activated when you enter any of the interactive math modes.

- **Running totals:** When you use interactive math, you can rotate from calculator math to horizontal math to vertical math. You can carry a total from one mode to another without interrupting the calculation.

- **Number of decimal places:** In each mode you can specify the "precision," or the number of decimal places you want displayed in an answer.

## Use of Keys
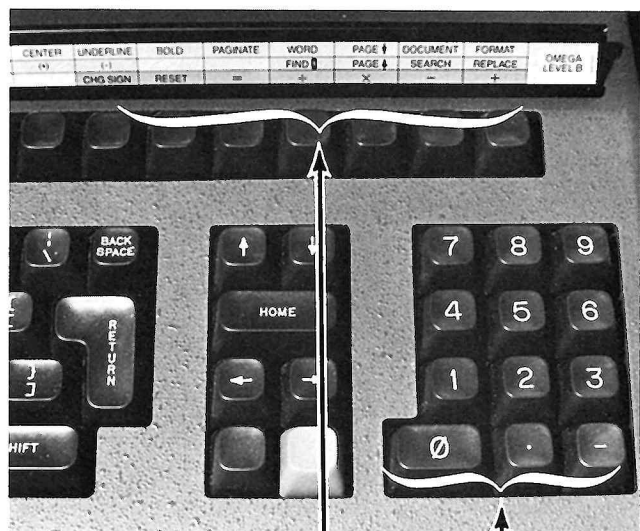


**Numeric Ten-Key Pad**

**Special Function Keys**

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## Running Totals
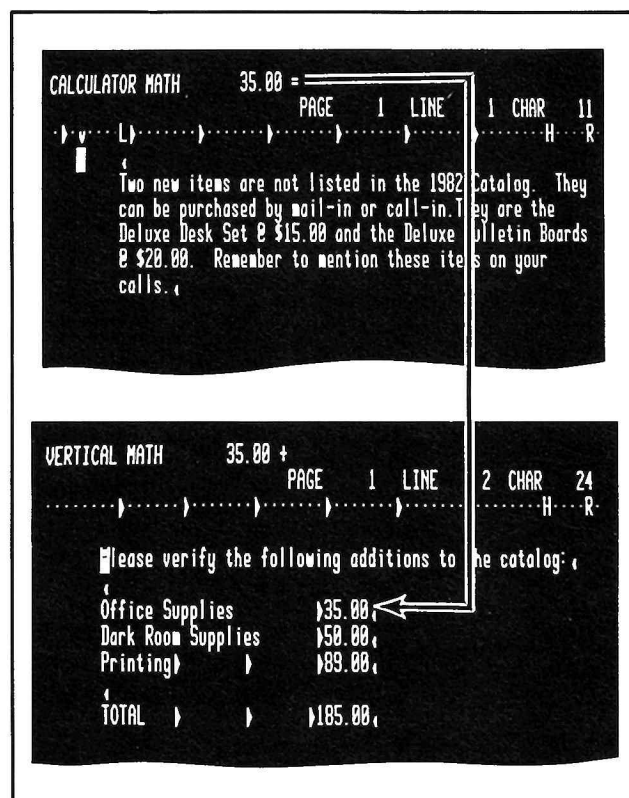


## Number of Decimal Places - "Precision"

| 1129 | No decimal places |
| 1129.0 | 1 decimal place |
| 1129.00 | 2 decimal places |

# Calculator math

In the calculator mode, you can use the numeric ten-key pad as you would use a calculator. The system adds, subtracts, multiplies, or divides the numbers you type, and shows the totals in the display area at the top of the screen.

## Procedure

To perform a calculation, complete these steps.

1. To enter the calculator mode, you press COMMAND and type C1.

2. Then type the first number to be calculated and indicate the type of calculation you want to perform by pressing the appropriate calculation key on the special function strip—add (+), subtract (-), multiply (x), or divide (÷).

3. Continue by typing the remaining numbers and pressing the appropriate calculation keys. You can indicate negative numbers by pressing the CHG SIGN key after typing the number.

4. You display the answer in the display area at the top of the screen by pressing the equal sign (=).

When you finish your calculation, you can press RESET to clear the display area for a new calculation. When you are ready to return to the normal editing mode, press the RED key.

### Displaying an answer in text or in a table

If you want your answer displayed in text or in a table, you can create two field markers at the location where you want the answer displayed. These field markers must be inserted before you enter calculator mode. To insert a field marker in text, you press COMMAND and type MF (Make Field). Then, after the calculation has been performed, press COMMAND to enter the vertical mode. Position the cursor on the second field marker, and press the equal sign. The answer then displays in the text.
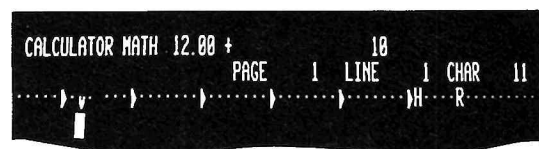
## Calculator Math

### 1. Enter Calculator Mode

```
CALCULATOR MATH    -0-
                        PAGE   1  LINE   1  CHAR   11
  ·▶·v·····▶······▶·····▶······▶······▶·····)H····R······
  ▌
```

### 2. Type the First Number and Press the Appropriate Calculation Key
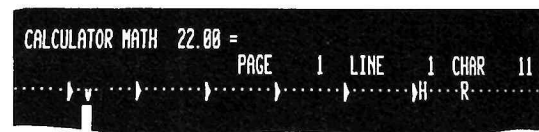
```
CALCULATOR MATH  12.00 +
                        PAGE   1  LINE   1  CHAR   11
····▶·v··· ·▶·····▶·····▶······▶·····▶······)H····R······
   ▌
```

### 3. Type Next Number and Press the Appropriate Calculation Key
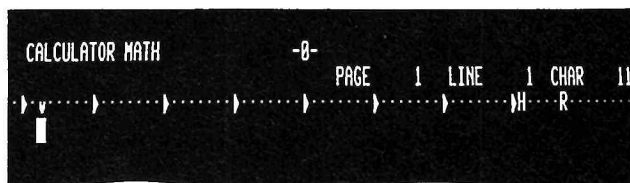
```
CALCULATOR MATH  12.00 +          10
                        PAGE   1  LINE   1  CHAR   11
····▶·v··· ▶······▶·····▶······▶·····▶······)H····R······
   ▌
```

### 4. Press Equal Sign
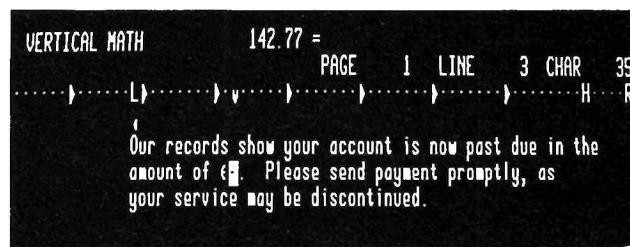
```
CALCULATOR MATH  22.00 =
                        PAGE   1  LINE   1  CHAR   11
····▶·v··· ·▶·····▶·····▶······▶·····▶······)H····R······
   ▌
```

### RESET For a New Calculation

```
CALCULATOR MATH         -0-
                        PAGE   1  LINE   1  CHAR   11
·▶·v·····▶······▶·····▶······▶·····▶······)H····R······
 ▌
```

### Displaying an Answer in Text or in a Table

```
VERTICAL MATH           142.77 =
                        PAGE   1  LINE   3  CHAR   35
·····▶···L)······)·v··▶·····▶······▶·····▶······H··R·····
         ▪
      Our records show your account is now past due in the
      amount of ¢▌.  Please send payment promptly, as
      your service may be discontinued.
```

# Horizontal and vertical math

In the horizontal and vertical modes, you can calculate or verify the totals of rows and columns of typed numbers without retyping.

## Prerequisite for typing figures in rows or columns

Numbers calculated in horizontal and vertical math modes must be aligned on decimal tabs. You can designate negative numbers with -, (), or < >. OMEGA recognizes -12, (12), and <12>, for example, as negative numbers.

## Horizontal math procedure

To perform horizontal math, complete these steps.

1. Position the cursor on the beginning of the first row to be calculated and enter the horizontal mode by pressing COMMAND and then typing C2.

2. Press the appropriate calculation key. Each time you press the +, -, x, or ( ÷ ) key, the cursor automatically moves across to the next number in the row. A running total displays at the top of the screen as each number is calculated.

3. To display the answer, press the equal sign. It will appear at the cursor location and at the top of the screen.

When you complete a calculation, you can press RESET to clear the total at the top of the screen and start a new calculation. Press the RED key to return to the normal editing mode.

## Vertical math procedure

Vertical math is similar to horizontal math. The major difference is that calculations are performed on columns, not rows. The cursor moves from top to bottom rather than left to right. You enter this mode by pressing COMMAND and typing C3. Each time you press a calculation key, the cursor automatically moves down to the next number in the column. OMEGA displays a running total, just as it does in horizontal math.

## Displaying an answer in a table or within a line of text

- **In a table:** If you want a total displayed in a table, create an empty tab stop before you enter horizontal math or vertical math.

- **Within a line of text:** If you want the total displayed within a line of text, create two field markers in the text before entering horizontal mode or vertical mode. To display the answer, position the cursor on the second field marker and press the equal sign.

### 1. Position Cursor and Enter Horizontal or Vertical Math Mode



### 2. Press Calculation Key



### 3. Press Equal Key



### RESET For a New Calculation



### Displaying an Answer

#### In Table



#### In Text



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# Interactive math considerations

When using calculator, horizontal, or vertical math, the number of decimal places displayed in an answer is determined by the "precision" setting. You can also carry a running total from one mode to another. Both of these are explained below.

### Precision

Precision refers to the number of digits following a decimal point. In OMEGA interactive math, the default setting for precision is 2. This means that totals are displayed with two decimal places, for example 38.00.

When you are working with dollar amounts, you want totals displayed with two decimal places. But for an inventory of supplies, you would not need any decimal places. You can change the precision of the totals OMEGA displays whenever the system is in one of the three interactive math modes. Simply type p followed by the number of decimal places desired. The totals will then display with that number of decimal places.

### Moving from one mode to another

When the system is in any one of the three interactive math modes, you can rotate to another mode without resetting or returning to normal editing mode. In this way, you can carry a running total from one mode to another. To do this, you simply press COMMAND once or twice to rotate to the desired mode.

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**Number Before Changing Precision (2 decimal places)**

```
CALCULATOR MATH          135.00 +
                            PAGE   1  LINE   1  CHAR   11
```

**Type p Followed by Desired Number of Decimal Places**

```
PRECISION
                            PAGE   1  LINE   1  CHAR   11
```

**Number After Changing Precision (no decimal places)**

```
CALCULATOR MATH          135 +
                            PAGE   1  LINE   1  CHAR   11
```

**Moving From One Mode to Another**

```
CALCULATOR MATH          -0-
                            PAGE   1  LINE   1  CHAR   11
```

COMMAND
↓

```
VERTICAL MATH            -0-
                            PAGE   1  LINE   1  CHAR   11
```

COMMAND
↓

```
HORIZONTAL MATH          -0-
                            PAGE   1  LINE   1  CHAR   11
```

COMMAND
↓

```
CALCULATOR MATH          -0-
                            PAGE   1  LINE   1  CHAR   11
```

# Summary

In this section you learned about interactive math, one of the two math features that OMEGA offers. This feature is best for calculations that are short and have few repeated operations. The three interactive math modes are summarized below.

| Mode | Command | Function |
|---|---|---|
| Calculator | C1 | For using the system like a calculator. |
| Horizontal | C2 | For calculating figures in rows and for placing totals from calculator math operations into text. |
| Vertical | C3 | For calculating figures in columns and for placing totals from calculator math operations into text. |

**Now complete Disk Instruction 12.1, Interactive Math. To do this:**

• **Turn on the system, if necessary, and insert the Master disk into Drive A.**

• **Fill in the date and time.**

• **When the margin scale appears, insert your Training disk into Drive B and display the Index.**

• **Recall document 12.1 Interactive Math.**

# Disk Instruction

The disk instructions for the remainder of this section, Interactive Math, are given to you in print, not on the screen. This is necessary because the examples require you to display a saved document on the screen. You would be unable to follow directions given on the screen.

**1. Using interactive math modes:** Interactive math includes calculator, horizontal, and vertical math.

### A. EXAMPLE - Placing a calculated total in the text

In this example you will use the calculator and vertical modes to perform a calculation and place the total in the Sample Text displayed on the screen.

1. Read the Sample Text and notice where the two field markers are located. The result of the calculation you perform will display between them.

2. Enter calculator mode—COMMAND C1.

3. To find the total needed in the letter, multiply 375 by 1.89.

4. Press the equal sign to display the answer at the top of the screen.

5. To change from one mode to another, in this case from calculator to vertical mode, press COMMAND once.

6. Position the cursor on the second field marker.

7. To place the answer, 708.75, in the text, press the equal sign again.

8. Press the RED key to cancel vertical mode.

### B. EXAMPLE - Keeping a running total

In this example you will use horizontal math mode to add up a row of regional sales figures. Then, in vertical math mode, you will add that amount to the sales totals for three other quarters to get the total sales figures for a year.

1. Read the Sample Text and notice the three places where tab markers are located. You will be displaying totals at each of these locations.

2. Enter horizontal mode—COMMAND C2.

3. Total the row—position the cursor on the first number, press +, and repeat.

4. Display the total, 12,700.00, at the tab marker at the end of the row—(=).

5. To carry this total from horizontal to vertical mode, press COMMAND and notice that you are in calculator mode. Now press COMMAND a second time to enter vertical mode.

6. Display the total, 12,700.00, in the first line of the column, across from the words "1st quarter." Do this by placing the cursor after the tab marker in the column and pressing the equal sign.

7. Now place the cursor after the second entry in the column, 6,800.00, and total the column.

8. Display the total, 34,250.00, at the last tab marker in the column, across from the words "YEAR'S TOTAL" by pressing the equal sign.

**Turn to the next page and complete Cumulative Example 12.1.**

# Cumulative Example 12.1

In this example you will perform calculations using all three interactive math modes, the calculator, horizontal, and vertical modes. After typing the sample table and text, you will add a row, add a column, multiply the column total by 12, and then place the answer in the text. Refer to your Instructional Guide, if necessary, to complete the example.

1. On a blank screen type the table and the Sample Text shown below. The decimal tabs are set at character positions 15, 25, 35, and 50. Be sure to place the tab markers where they are shown in the last column.

```
        35.00     28.00     229.00         ▶
         8.00     74.00     100.00     182.00
        44.00     72.00      12.00     128.00
          ▶         ▶          ▶          ▶
If we multiply this total by 12, we get ⟨⟨ , the amount for
one year.
```

2. Enter horizontal mode.

3. Total the first row and display the answer.

4. Carry the total from the horizontal to the vertical mode.

5. Total the last column and display the answer.

6. Change from vertical to calculator mode.

7. Multiply the column total by 12.

8. Display the answer in the text.

9. Check your answer with the one given on the last page of this system guide.

**You have now completed Section 1. Turn to the next page to begin Section 2.**

# OMEGAMATH

In the first section of this system guide you learned about one of the two math features OMEGA offers, interactive math. The rest of this system guide covers OMEGAMATH, the system's automatic math feature.

OMEGAMATH lets you perform a variety of math operations with a minimum of instructions. It provides an efficient way to work with tables in which multiple calculations are performed and a number of math operations are repeated, such as the one shown at the right.

In this section you will learn the requirements for using OMEGAMATH and the basics of writing math instructions. Math instructions are required for performing calculations automatically. They also determine how your answers are displayed.

Sample Math Application

```
                    RADLOFF MANUFACTURING CO.

                        CHANGE IN ASSETS

                      FIRST QUARTER, 1980

ASSET                                                  1ST
CLASS          JANUARY     FEBRUARY       MARCH      QUARTER

Cash            56,394       52,445      -71,789      37,050
Inventory       49,967     -101,224           58     -51,199
Receivables     -1,244        8,016       10,228      17,000
Prepaid Expen        0            0          810         810
Office Supplies    123          701         -551         273
Plant/Equipment      0       -8,423      110,000     101,577

MO.TOTALS      105,240      -48,485       48,756     105,511
```

# OMEGAMATH requirements

Before you can use OMEGAMATH to perform calculations, you must see that your document meets three requirements. The format and the way numbers are typed are very important when you use OMEGAMATH.

**Automatic math requirements**

1. Numbers must be aligned on decimal tabs.

2. Tab markers must precede each number and must be displayed where the answers will display.

3. The beginning of the calculation area must be defined by a math-begin instruction, and the end defined by a math-end instruction. These instructions tell OMEGA where calculations will be performed in a document.

**Typing figures in rows and columns**

• Each row of figures must be followed by a RETURN so that OMEGA can recognize it as a row. OMEGA recognizes columns by the decimal tabs you set.

• Negative numbers can be designated with -, (), or <>. For example, -35, (35), and <35> will be calculated as negative by the system.

**OMEGAMATH Requirements**

**1. Decimal Tabs**
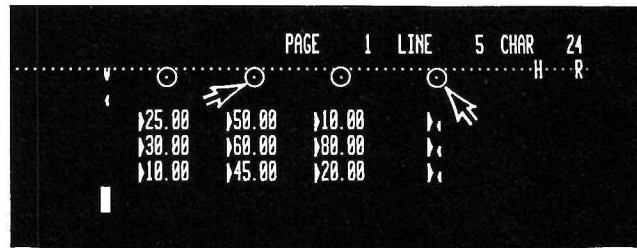


**2. Tab Marker**
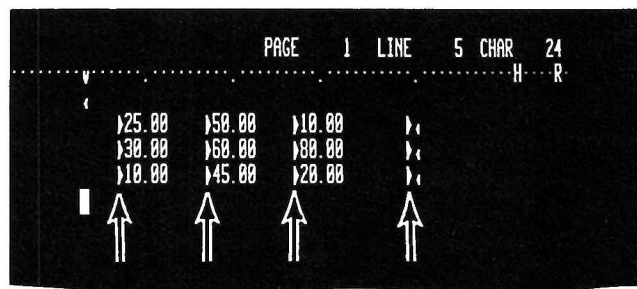


**3. Math-begin and Math-End Instructions**



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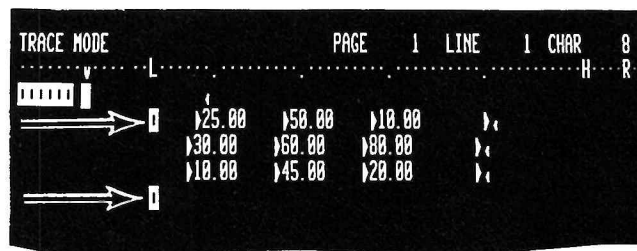
# Using OMEGAMATH

The figures you calculate in OMEGAMATH must be identified by a math-begin and a math-end instruction. The area between these instructions is referred to as the "calculation area." This is where OMEGA performs automatic math operations.

## Math-begin instruction

The math-begin instruction has two main purposes. First, it defines the beginning of the calculation area for OMEGA. The math-begin instruction also tells OMEGA what calculation to perform, and how to display the answers.

### Creating a math-begin block

1. The math-begin instruction is always created at the left margin of the first line of figures to be calculated.

2. To create a math-begin block, you first tell the system what calculations to perform by typing the math instructions. (The math instruction shown in the illustration, +r, tells the system to add all of the rows in the table. You will learn more about this and other basic math instructions below.) As you type the math instructions, the first row of numbers in the table will temporarily move to the right.

3. When you have typed the instruction, you define it as a block. Surround the instruction with block markers using BLOCK b and BLOCK e.

4. To complete the math-begin instruction, press BLOCK, and then (CTRL) MATH. The instruction, which disappears from the screen, is stored in a format marker. It can only be seen in Trace Mode. When you store the instruction in a math block, the numbers in the first row realign.
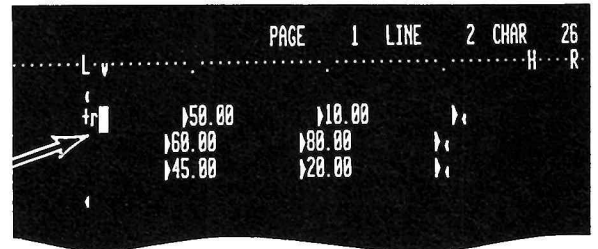
You can view the instructions in a math block by entering Trace Mode and positioning the cursor on the math block format marker. The math instructions display in the message area.
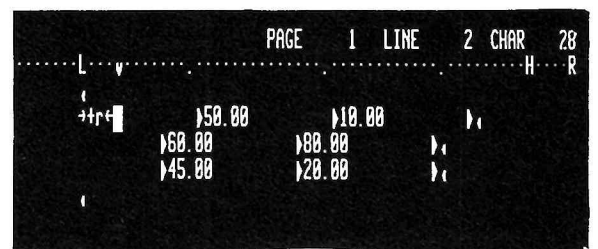
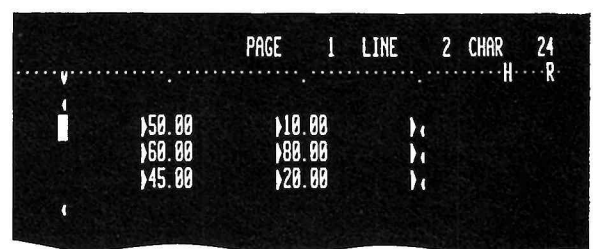## Math-begin Instructions

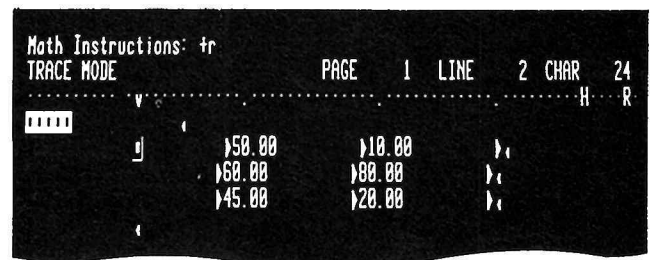### 1. Position Cursor at Left Margin
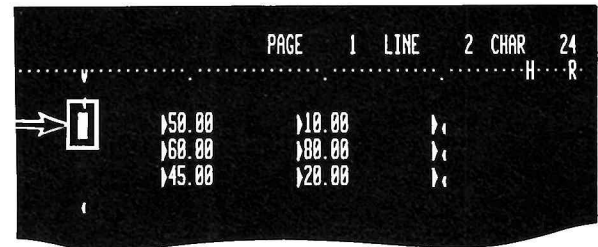


### 2. Type Instruction



### 3. Define Instruction as Block



### 4. Complete the Math Instruction



## View Math Instructions in Trace Mode

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## Basic math instructions

The instructions you type in a math-begin block tell OMEGA what calculations to perform. The following basic math instructions apply to all rows or all columns in a table.

- To add all rows, type +r
- To add all columns, type +c
- To add all rows and columns, type +r:+c

Math instructions are always typed in lower case and contain no blank spaces. When more than one math instruction is given, (as in +r:+c), they are separated with a colon.

## Creating a math-end block

A math-end instruction is an empty math block located at the end of the calculation area. It tells OMEGA where the calculation area ends.

1. The location of a math-end instruction depends on the type of calculation you want to perform. For row calculations, position the cursor at the left margin below the last row to be calculated. For column calculations or for calculations on both rows and columns, position the cursor at the left margin of the line on which the column totals will display.

2. To create a math-end block, create an empty block by typing BLOCK b and BLOCK e at the appropriate location.

3. Complete the math-end instruction by pressing BLOCK and then (CTRL) MATH. The empty block disappears from the screen and is stored in a format marker, which can be seen in Trace Mode.

## Instructing the system to perform a calculation

Once you have created the math-begin and the math-end instructions, you are ready to have the system perform the calculation. To do so, simply position the cursor above the calculation area and press (CTRL) MATH.

To cancel a math calculation at any time, press the RED key.

## Math-end Instruction

### 1. Position Cursor

**For Row Calculation**



**For Column Calculations or
For Calculations on Both Rows and Columns**



### 2. Define Empty Block



### 3. Complete the Math Instruction



**View Math Instructions in Trace Mode**



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# Editing in OMEGAMATH

Once you have completed a calculation, you can easily make changes if necessary. You can change the numbers in the table itself, or change the math instructions. In either case, you can easily instruct OMEGA to recalculate the totals for you.

## Changing the calculation area

You can edit the numbers in the table, leave the old totals as they are and recalculate by positioning the cursor above the table and using (CTRL) MATH. The system replaces the old totals with new ones.

## Changing the math instructions

If you want to change the math instructions, you can recall them and make any desired changes.

1. To change the math instructions, go into Trace Mode and position the cursor on the math-begin block.

2. Press RECALL and the instructions display on the screen. You can then make any changes to the instructions.

3. When you have done so, place the revised instructions back in the math block by pressing BLOCK and then (CTRL) MATH.

## Changing the Math Instruction

### 1. Enter Trace Mode and Position Cursor



### 2. Recall Math Instruction



### 3. Turn Revised Instruction into a Math Block



### View Revised Math Instructions in Trace Mode

# Displaying the answers

**You can change the way that answers are displayed to suit your needs.**

### Precision

Precision refers to the number of digits that display to the right of the decimal point. You can change the precision of the totals OMEGA displays depending on the accuracy you need in your totals.

OMEGAMATH's default setting for precision is p2, or 2 decimal places. If you want a different precision, you can include precision instructions in the math-begin block. To change the precision, type a p, followed by the desired number. For example, p1 instructs OMEGA to display totals with one digit after the decimal point, such as 38.1; p0 instructs OMEGA to include no digits after the decimal. Precision instructions are entered before the calculation instructions they are to affect. Separate the instructions with a colon, as shown in the illustrations. Precision instructions affect all totals in a calculation area until a new precision instruction is given.

### Negative precision

Negative precision refers to digits to the left of the decimal point. When negative precision is specified, OMEGA rounds numbers off to the left of the decimal point. A precision of p-1, for example, instructs OMEGA to round off to the nearest 10. To round off to the nearest hundred, use p-2. Like precision instructions, negative precision is indicated before calculation instructions.

Precision

| p0 | 1129 | No decimal places |
| p1 | 1129.0 | 1 decimal place |
| p2 | 1129.00 | 2 decimal places |

```
Math Instructions: p1:tr
TRACE MODE              PAGE    1   LINE    2  CHAR   24
............................v.............................H....R.
▮▮▮▮▮
     ◢        )27.0        )50.0        )77.0(
              )30.0        )60.0        )90.0(
              )10.0        )43.0        )53.0(
     ◼(
```

Negative Precision

| p-1 | 1760 | Round to nearest 10 |
| p-2 | 1800 | Round to nearest 100 |
| p-3 | 2000 | Round to nearest 1000 |

```
Math Instructions: p-1:tr
TRACE MODE              PAGE    1   LINE    2  CHAR   24
............................v.............................H....R.
▮▮▮▮▮▮▮▮▮▮▮▮▮
     ◢        )27.0        )50.0        )80(
              )30.0        )60.0        )90(
              )10.0        )43.0        )50(
     ◼(
```

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# Summary

This section introduced OMEGAMATH, the system's automatic math feature. Before you use OMEGAMATH, your document must meet three requirements:

• Numbers must be aligned on decimal tabs.
• Tab markers must precede each number and be placed where the answers will appear.
• The calculation area must be defined with math-begin and math-end instructions.

Examples of the basic math instructions presented in this section are shown below.

| Math Instruction | Example |
|---|---|
| Add all rows | +r |
| Add all columns | +c |
| Add all rows and columns | +r:+c |
| Precision 0; add all columns | p0:+c |
| Negative precision; add all rows | p-1:+r |

Now complete Disk Instruction 12.2, Basic Automatic Math. To do this:

• **Turn on the system, if necessary, and insert the Master disk into Drive A.**

• **Fill in the date and time.**

• **When the margin scale appears, insert your Training disk into Drive B and display the Index.**

• **Recall document 12.2 Basic Automatic Math.**

# Cumulative Example 12.2

**In this example you will create the table shown below on the screen, write basic math instructions, and perform calculations. Refer to your Instructional Guide, if necessary, to complete the example.**

1. On a blank screen type the table shown below. The decimal tab settings should be 15, 30, 45, and 60. Be sure to place tab markers wherever they are shown below.

| | | | |
|---|---|---|---|
| 55.00 | 1200.00 | 85.00 | ▶ |
| 2300.00 | 14.00 | 7.00 | ▶ |
| 86.00 | 555.00 | 40.00 | ▶ |
| ▶ | ▶ | ▶ | ▶▶ |

2. Write the math-begin and math-end instructions for adding all of the rows and all of the columns in the table. Have the system display the answers with no numbers to the right of the decimal points.

3. Instruct the system to perform the calculation.

4. Change the math instructions so that the answers are displayed with one number to the right of the decimal point.

5. Have the system recalculate the totals.

6. Delete the last row of the table, the one in which the column totals are displayed. Do not delete the math-end instruction on the last row. Position the cursor on the space after the math-end block and press DEL LINE.

7. Change the math instructions so that the system adds only the rows.

8. Instruct the system to recalculate the totals.

9. Now change the math instructions so that the answers are rounded to the nearest 100.

10. Have the system recalculate the totals.

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**You have now completed Section 2. Turn to the next page to begin Section 3.**

# Writing intermediate math instructions

At this point you are familiar with the requirements and procedures for performing basic OMEGAMATH operations. This section covers the intermediate-level math operations that you can instruct OMEGA to perform. Specifically, you will learn the instructions for performing calculations on selected rows and columns in a table, for calculating averages, for performing calculations on selected elements in a table, and for calculating percentages.

## Intermediate instructions

1. For selected rows and columns

2. For calculating averages

3. For selected elements in a table

4. For calculating percentages

## Sample Math Applications

| BUDGET CHANGES | | | | |
|---|---|---|---|---|
| | PROJECTED | ACTUAL | CHANGE | PERCENT OF CHANGE |
| Defense | 183.7 | 188.8 | 5.1 | 2.78% |
| Foreign Affairs | 11.5 | 11.2 | -0.3 | -2.61% |
| Space, Science | 7.0 | 6.9 | -0.1 | -1.43% |
| Energy | 11.3 | 4.2 | -7.1 | -62.83% |
| Environment | 14.3 | 11.9 | -2.4 | -16.78% |
| Agriculture | 6.5 | 4.4 | -2.1 | -32.31% |
| Transportation | 22.9 | 19.7 | -3.2 | -13.97% |
| Community Development | 11.1 | 8.1 | -3.0 | -27.03% |
| Education, Social Services | 35.0 | 25.7 | -9.3 | -26.57% |
| Health | 76.7 | 73.3 | -3.4 | -4.43% |
| Income Security | 256.1 | 241.2 | -14.9 | -5.82% |
| Veterans Benefits | 25.0 | 24.0 | -1.0 | -4.00% |
| TOTAL | 661.1 | 619.4 | -41.7 | -6.31% |

# Math instructions for selected rows or columns

Often calculations performed on a table involve only some of the rows and columns. OMEGAMATH lets you select the specific rows and columns you want the system to use in performing calculations.

## Identifying rows and columns

When you want to perform calculations on selected rows or columns, you identify specific rows and columns by number in the math-begin instruction. OMEGA recognizes rows and columns in a table in the following ways:

1. Rows are numbered from top to bottom beginning with r1. OMEGA recognizes a row by the return marker. Therefore, a blank line containing only a return marker is considered a row.

2. Columns are numbered from left to right, beginning with c1. OMEGA recognizes a decimal tab as a column, whether or not numbers are typed on the tab stop.

3. Columns of descriptive text not typed on decimal tabs are not considered columns by the system.

The illustration shows how rows and columns are numbered in a table.

## Sample calculations

Examples of math instructions for selected rows or columns are shown below.

- Add row 2—+r2
- Add column 1—+c1
- Add row 1 and column 1—+r1:+c1

NOTE: Precision and negative precision instructions are used the same way as they are for calculations involving all rows and columns. For example:

- Add row 2 and display the answer with no decimal places—p0:+r2
- Add column 3 and round the answer to the nearest 10—p-1:+c3

## Identifying Rows and Columns



Column 1   Column 2   Column 3

|  | | o PAGE 1 LINE 1 | |
| --- | --- | --- | --- |
| Row 1 | January | ▶11.00 ▶15.00 | ▶30.00◀ |
| Row 2 | February | ▶20.00 ▶12.00 | ▶32.00◀ |
| Row 3 | March | ▶6.00 ▶40.00 | ▶21.00◀ |
| Row 4 | | | |
| Row 5 | Total | ▶ ·▶ | ▶◀ |

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# Averages

You can instruct the system to take the average of rows or columns of numbers in a table. The math instruction for averaging is a lower case "a".

**Math instructions for averaging**

Averaging instructions can be used on all rows or columns in a table. Below are some examples.

- Average all rows—a+r
- Average all columns—a+c
- Average all rows and columns—a+r:a+c

In the following examples, math instructions are given for averaging selected rows and columns.

- Average row 2—a+r2
- Average column 4—a+c4

NOTE: An "a" precedes the add row(s) or add column(s) instruction and is not separated by a colon like other instructions, such as "p0:".

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Averaging

Math Instructions: a+r:a+c
TRACE MODE                    PAGE    1   LINE   2   CHAR   24
                                                         H   R

▶50.00    ▶10.00    ▶
▶60.00    ▶80.00    ▶
▶45.00    ▶20.00    ▶

# Math instructions for selected elements in a table

In addition to calculating whole rows and columns, OMEGAMATH lets you perform calculations on individual numbers within a table. These numbers are referred to as "elements." You can instruct the system to perform addition, subtraction, multiplication, and division on selected elements in a table and to place the answer in any element location.

To perform calculations on elements, the math instructions you give the system must contain four items: the name of the elements to be calculated, the math operation you want to perform, an equal sign, and the location in which the answer should display.

## Identifying elements in a table

Every number in a table can be identified by its location. The location is designated by a row or column number and an element number. Elements in a row are numbered from left to right, starting with e1. Elements in a column are numbered from top to bottom, starting with e1. As the first illustration shows, each element in a table has two names. One refers to the element's location in a row, and the other refers to its location in a column. The name you use in a math instruction depends on whether you want to perform a row calculation or a column calculation.

## Math instructions

The math instructions for selected elements in a table must contain the following information:

1. The name of elements to be calculated, for example r1e1 and r1e2.

2. The mathematical sign of the operation to be performed, +, -, x, or /.

3. An equal sign, =.

4. The element location where the answer will display, such as r1e3.

The second illustration shows a complete math instruction: r1e1+r2e2=r3e3. This instruction tells the system to add the first element in row 1 (11) to the second element in row 2 (44) and place the sum (55) in the third element location in row 3.

### Identifying Elements in a Table

|        | Column 1          | Column 2          | Column 3          |
|--------|-------------------|-------------------|-------------------|
| Row 1  | r1e1 or c1e1      | r1e2 or c2e1      | r1e3 or c3e1      |
| Row 2  | r2e1 or c1e2      | r2e2 or c2e2      | r2e3 or c3e2      |
| Row 3  | r3e1 or c1e3      | r3e2 or c2e3      | r3e3 or c3e3      |
| Row 4  | — no table elements on this line - | | |
| Row 5  | r5e1 or c1e5      | r5e2 or c2e5      | r5e3 or c3e5      |

### Math Instructions for Selected Elements



Math Instructions: r1e1+r2e2=r3e3
TRACE MODE          PAGE   1  LINE   2 CHAR   24
11.00   22.00
33.00   44.00
55.00

# Calculations in the same row or column or on the same element in each row or column

OMEGAMATH provides you with an instruction shorthand to minimize the number of math instructions that you type. It lets you shorten instructions in two ways.

1. **By omitting row or column numbers:** If a row or column number remains the same throughout a calculation, you only need to type it once, at the beginning of the math instruction. In the first illustration, the entire calculation takes place in row 4. So r4 is typed only once in the shorthand version.

2. **By omitting the row or column number completely:** If the same calculation is being performed on all rows or all columns, you can omit the row or column number from the math instruction. In the second illustration, the same calculation is repeated on all three rows in the table. The row number, therefore, is not typed.

Instruction Shorthand

| Standard Instruction | Shorthand |
|---|---|
| 1. r4e1+r4e2=r4e3 | r4e1+re2=re3 |
| r1e1xr1e2=r1e3 | |
| 2. r2e1xr2e2=r2e3 | re1 x re2=re3 |
| r3e1xr3e2=r3e3 | |

# Percentages

By including a percent sign (%) in the math-begin instructions, you can have the system perform percentage calculations.

### Sample percentage calculations

Notice in the sample calculations below that the percent sign immediately follows the percentage to be added, subtracted, multiplied, or divided. The percent sign is not separated from the number with a colon.

1. To calculate the sum of a number and a certain percentage of that number:

   re1+re2%=re3
   200+25% =250

   In this example, 200 plus 25% of 200 (50) equals 250.

2. To calculate the difference between a number and a certain percentage of that number:

   re1-re2%=re3
   200-25% =150

   In this example, 200 minus 25% of 200 (50) equals 150.

3. To calculate a certain percentage of a number:

   re1xre2%=re3
   200x25% =50

   In this example, 25% of 200 equals 50.

4. To calculate what a number is a certain percentage of:

   re1/re2%=re3
   200/25% =800

   In this example, 200 is 25% of 800.

### Sample Percentage Calculation



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# Summary

In this section you learned to perform math operations using the system's intermediate level math instructions. Examples of these instructions are shown in the chart below.

| Math Instruction | Example |
|---|---|
| Perform calculations on selected rows and columns | +r1:+c3 |
| Perform calculations on selected elements | r1e1+r3e4=r5e5 |
| Calculations on all rows and columns. | re1+re2=re3 |
| Calculations on the same row or column. | r2e1+re2=re3 |
| Averages | a+c |
| Percentages | re1xre2%=re3 |

**You have now completed Section 3. Turn to the next page to begin Section 4.**

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# Writing advanced math instructions

In working with tables you may sometimes need to perform advanced operations. By adding to the math instructions that you have already learned, you can have the system perform higher-level operations. For example, in one math-begin instruction you can tell OMEGAMATH to combine many different math operations on many different rows, columns, and elements. You can also instruct the system to change the order in which it performs calculations. And you can have the system perform calculations using numbers that are not contained in the table.

### Advanced applications

1. Combining operations

2. Connecting operations

3. Changing order in which calculations are done

4. Using numbers not in table

5. Replacing the element with the calculated total

6. Calculating the last row

7. Stopping OMEGAMATH

The following consolidated statement of operations, shareholder's equity and changes in financial position of the Company and its subsidiaries of each of the five years in the period ended December 31, 1982 have been examined by Arthur Andersen & Co., independent public accountants, as set forth in their report included elsewhere herein, and should be read in conjunction with the financial statements and related notes included in Item 12 of the Form 10-K.

CONSOLIDATED STATEMENTS OF OPERATIONS

| | | | | | |
|---|---|---|---|---|---|
| NET SALES (notes B, F and I) | $13,801,633 | $ 4,469,310 | $ 2,329,195 | $ 3,019,423 | $5,965,104 |
| COSTS AND EXPENSES: | | | | | |
| Costs of sales, exclusive of depreciation and amortization (Note F) | 10,294,255 | 3,594,715 | 1,050,035 | 2,107,473 | 3,479,079 |
| Depreciation and amortization of property, plant and equipment (NoteG) | 783,953 | 366,361 | 8,481 | 27,926 | 63,087 |
| Research and development costs | 1,044,526 | 684,396 | 474,966 | 499,714 | 624,986 |
| Selling, general and administrative expenses | 2,519,374 | 2,060,785 | 545,610 | 1,234,644 | 1,886,228 |
| Loss on write-offs and abandonment of property, plant and equipment (Note A) | -- | 892,140 | -- | -- | -- |
| Interest income | (81,776) | (68,628) | (2,690) | (25,102) | (13,174) |
| Interest expense (Note A) | 658,787 | 321,605 | 10,004 | 76,591 | 233,468 |
| Amortization of debenture discount and offering costs (Note E) | -- | -- | -- | 34,111 | 139,781 |
| | $ | $ | $ | $ | $ |

## #1 Combining instructions in a math block

You can combine a virtually unlimited number of math instructions in a math block. The only requirement is that you place colons between the math instructions to separate them. The system carries them out in order from left to right. It completes each math instruction on all rows or columns before carrying out the next instruction. See the illustration at the right.

## #2 Connecting instructions in a math block

Sometimes you might want the system to perform all of the calculations on one row or column before going on to the next row or column. To tell the system to connect math instructions, type an underscore "__" (shifted 0) between the instructions in place of a colon, as shown at the right. The system then performs all of the calculations on a particular row or column before performing any calculations on the next row or column.

NOTE: Row and column calculations cannot be connected to each other. They must be separated with a colon. For example: ce1+ce2=ce3__ ce3 - ce1=ce5:+r.

## #3 Changing the order in which calculations are performed

Within a math instruction you can have the system perform multiple math operations that involve multiple elements. OMEGAMATH carries out each math operation in order from left to right. With some applications, however, you may want the system to change the order in which it performs calculations. You can do this by using parentheses. The system first performs the math operation inside the parentheses and then carries out the remaining instructions in the usual order, from left to right. Notice in the illustration at the right that the order in which calculations are performed can affect the total.

## #4 Numbers not in table

Constants, or numbers not in the table, can be included in math instructions. In the illustration at the right, 3 and .75 are constants.

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**Combining Instructions**

| re1+re2=re3: re3+re4%=re5 |

**Connecting Instructions**

| re1+re2=re3 __ re3+re4%=re5 |

**Changing the Order**

| re1xre2+re3/re4=re5 |
| 5 x8 + 6 / 2 = 23 |
| re1x(re2+re3)/re4=re5 |
| 5 x (8 + 6) / 2 = 35 |

**Using Constants**

| re1+3xre2/.75=re3 |

#### #5 Replacing the element with the calculated total

You can instruct the system to perform a calculation on an element in a table and replace the element with the calculated total. In the illustration shown at the right, the instruction is re1xre2=re2.

This replacement instruction tells the system to multiply row element 1 by row element 2 and place the product in row element 2. After the calculation is performed, the value of row element 2 is replaced with the answer, as shown in the illustration.

#### #6 Calculating the last row of a table

You learned earlier that for row calculations you place the math-end instruction at the left margin below the total row. Because the math-end instruction precedes the figures in the total row, OMEGA does not include this row in the calculation. If you want this row included, you must type an "i" (for include) directly in front of the math instruction. This tells the system to include the total row in the calculation. Note in the illustration at the right that the instruction is not separated by a colon.

#### #7 Stopping OMEGAMATH

All calculations in a long document may be contained in one calculation area, or several calculation areas may be located throughout the document. Once the system is instructed to perform automatic math, it automatically searches the entire document to make sure it has completed all calculations. If you want the system to stop after completing the calculations in a particular calculation area, type "s" (for stop) at the end of the math-begin instruction. This instruction must be separated from the other instructions with a colon, as shown in the illustration at the right.

### Replacing the Element with the Calculated Total
#### Before Calculating



#### After Calculating



### Calculating the Last Row of a Table
#### Without Include



Last row not added

#### With Include



Last row added

#### Using Stop



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# Summary

This section described the math instructions used to perform advanced operations with OMEGAMATH. Examples of the math instructions presented in this section are shown below.

| Math Instruction | Example |
|---|---|
| Combining instructions | p0:re1+re2=re3:p1:re4+re5%=re6 |
| Connecting instructions | p0__re1+re2=re3__p1 __ re4+re5%=re6 |
| Changing the order of calculations | re1x(re2+re3)/re4=re5 |
| Constants | re1+3xre2/.75=re3 |
| Replacement | re1+re2=re2 |
| Include | p0:+c:ire1+re2=re3 |
| Stop | re1xre2=re3:s |

Refer to your Reference Manual for more information on OMEGAMATH. Two additional features, symbols and MATHFORMATS, are discussed in Chapters 58 and 59.

**This concludes Module 12 of the Compucorp OMEGA Word Processing Training Program.**

# Answer

**Cumulative Example 12.1**

| | | | |
|---|---|---|---|
| 35.00 | 28.00 | 229.00 | 292.00 |
| 8.00 | 74.00 | 100.00 | 182.00 |
| 44.00 | 72.00 | 12.00 | 128.00 |
| | | | 602.00 |

If we multiply this total by 12, we get ⟨7,224.00⟩, the amount for one year.

**Cumulative Example 12.2**

3.

| | | | |
|---|---|---|---|
| 55.00 | 1200.00 | 85.00 | 1,340.00 |
| 2300.00 | 14.00 | 7.00 | 2,321.00 |
| 86.00 | 555.00 | 40.00 | 681.00 |
| 2,441.00 | 1,769.00 | 132.00 | 4,342.00 |

5.

| | | | |
|---|---|---|---|
| 55.00 | 1200.00 | 85.00 | 1,340.0 |
| 2300.00 | 14.00 | 7.00 | 2,321.0 |
| 86.00 | 555.00 | 40.00 | 681.0 |
| 2,441.0 | 1,769.0 | 132.0 | 4,342.0 |

8.

| | | | |
|---|---|---|---|
| 55.00 | 1200.00 | 85.00 | 1,340.0 |
| 2300.00 | 14.00 | 7.00 | 2,321.0 |
| 86.00 | 555.00 | 40.00 | 681.0 |

10.

| | | | |
|---|---|---|---|
| 55.00 | 1200.00 | 85.00 | 1,300 |
| 2300.00 | 14.00 | 7.00 | 2,300 |
| 86.00 | 555.00 | 40.00 | 700 |